# Mainz-Frankfurt-Münster CosmoCoffee

# Report of Contributions

https://indico.global/e/6719

Contribution ID: **1** Type: **not specified**

# Welcome

*Thursday 11 January 2024 10:30 (15 minutes)*

**Presenter:** SCHICHO, Philipp (Goethe University Frankfurt)

Contribution ID: **10** Type: **not specified**

# Improved precision for gravitational waves from scale symmetry breaking: how to supercool at high temperature?

*Thursday 11 January 2024 10:45 (45 minutes)*

This talk will discuss various aspects of predicting gravitational-wave signals from supercooled first-order phase transitions in models with classical scale invariance. Motivated by great prospects for observation of such a gravitational-wave signal, and by the consequent opportunities for reconstructing the parameters of the phase transition and the underlying model, I will present the route to improved accuracy in formulating theoretical predictions. I will explain how to employ the high-temperature effective field theory approach for studying supercooled phase transitions and compare the resulting predictions with those obtained with the common daisy-resummed potential.

**Presenter:** SWIEZEWSKA, Bogumila (University of Warsaw)

Contribution ID: **11** Type: **not specified**

# Effective Field Theory Approach to Binary Systems in Scalar-Tensor Theories

*Thursday 11 January 2024 13:30 (30 minutes)*

Theories beyond General Relativity typically contain at least one additional scalar degree of freedom, which effectively mediates an additional force. While this force must be highly suppressed in low-density environments–in order to pass current constraints–it generically leads to deviations from General Relativity in high-density / high-curvature environments, such as neutron stars and black holes, and thus impacts their observables. I will discuss how binary systems in scalar-tensor theories can be treated using an effective field theory approach and present results regarding observables such as the energy loss and the gravitational wave spectrum.

**Presenter:** DIEDRICHS, Robin Fynn (Goethe University Frankfurt)

Contribution ID: **12** Type: **not specified**

# Constraining f(R) Gravity with Modified Period Shifts in Pulsar Systems

*Thursday 11 January 2024 14:00 (30 minutes)*

Because of their high compactness and capability to bear dark charges neutron stars are very interesting objects when it comes to searching for deviations from general relativity. This is enabled by many observations of pulsar systems with astonishing precision in recent years. With these a general constraint on the parameters of f(R) theories can be calculated with a moderate numerical effort.

**Presenter:** SCHAPER, Yannik

Contribution ID: **13** Type: **not specified**

# All you need to know about Primordial Black Holes

*Thursday 11 January 2024 15:30 (30 minutes)*

In this presentation, I will elucidate the mechanisms behind Primordial Black Hole formation, discuss their potential role as candidates for dark matter, explore their significance as gravitational wave sources, and delve into the methodologies employed for their detection.

**Presenter:** ERFANI, Encieh (IASBS, Zanjan, Iran)

Contribution ID: **14** Type: **not specified**

# Gravitational Waves from Low-Scale Cosmic Strings

*Thursday 11 January 2024 15:00 (30 minutes)*

In this talk, I will discuss the effect of very low cosmic string tensions on the associated stochastic gravitational wave background. I will show that the gravitational wave spectrum is qualitatively different from the one produced by cosmic strings with larger tensions. In fact, it exhibits a very distinct oscillatory feature with dips in the amplitude at multiples of the frequency of the first dip. This feature arises if none of the cosmic string loops chopped off from the long-string network have fully decayed yet. Despite the low tensions, such an SGWB would be measurable in future experiments.

**Presenter:** SCHRÖDER, Tobias (University of Münster)

Contribution ID: **15** Type: **not specified**

# Impact of higher-dimensional operators on Low-Scale Leptogenesis

*Thursday 11 January 2024 16:30 (30 minutes)*

The addition of right-handed neutrinos to the SM can simultaneously solve the problems of neutrino masses and the observed baryon asymmetry of the universe. Moreover, their presence can lead to new experimental observations, like neutrinoless double beta decay. I showcase ongoing research that explores the impact of higher-dimensional operators on the aforementioned phenomena.

**Presenter:** WEBER, Sascha (Johannes Gutenberg-Universität Mainz)

Contribution ID: **17** Type: **not specified**

# Revisiting isocurvature perturbations

*Thursday 11 January 2024 17:00 (30 minutes)*

Isocurvature perturbations, despite being strongly constrained by current CMB data, enjoy continuing popularity in recent publications.
Nonetheless, the nature of isocurvature perturbations is neglected in many textbooks. There are not few who have little idea about it.
In this talk, we will revisit isocurvature by starting from the basic definition. We have a new perspective on the evolution of isocurvature modes in the long-wavelength limit, how they mix and behave in more complicated cosmic histories. We will have a first glimpse at the effect on the CMB and on popular cosmological tensions.

**Presenter:** GERLACH, Christopher